

TOTALLY AGILE RF SENSOR SYSTEMS SOL BAA 99-24, DUE 092299 POC Dr. Francis Patten,  
DARPA/ATO, FAX (703) 696-3999 EMAIL: [BAA99-24@DARPA.MIL](mailto:BAA99-24@DARPA.MIL) URL:  
<http://www.darpa.mil/baa/#ATO/>

**PROGRAM GOALS AND OBJECTIVES:** The Defense Advanced Research Projects Agency (DARPA) is soliciting innovative research proposals in Totally Agile RF Sensor Systems (TASS). This effort is intended to develop a family of tunable filters with very high-Q values and to integrate these components into very compact, very low-noise, very narrow-band-pass pre-selectors for use with communications receivers. This development will facilitate the detection of very weak signals in a dense environment of competing electromagnetic radiation. DARPA has funded programs to develop cryogenic pre-selectors consisting of High Temperature Superconductors (HTS) narrow band filters and low-noise semiconductor amplifiers, both operating at cryogenic temperatures. These cryogenic pre-selectors have demonstrated: 1) lowering of the noise figure of the system by operating at lower temperatures (~ 77K); 2) lowering of the noise floor of the system within band by excluding those portions of the electromagnetic spectrum outside the bandpass of interest, minimizing the intermodulation distortion products within the defined bandpass of the system generated by the mixing of those out-of-band signals. The objective of this program is to enhance the performance capabilities of these cryogenic pre-selectors by providing tunability of the HTS input filters without degrading the band-pass characteristics. To maintain the very high-unloaded Q-values currently realized for HTS filters very special tuning and reconfiguring techniques must be employed. It is the intent of this solicitation to explore new, innovative and creative technologies, which can contribute to this aim, while maintaining certain minimum values of tuning speed, repeatability, and reliability. Another objective is to reduce the size and weight of the system by a factor of approximately two from that previously achieved in the DARPA program.

**TEAMING:** In the evaluation of proposals to the TASS program, considerable emphasis will be placed on integrated approaches, i.e., proposals which tackle as many as possible of the challenges as outlined in the Proposer Information Pamphlet (PIP) and that demonstrate a clear understanding of the interrelationships between them. Therefore, teaming is encouraged to ensure that advances in materials and components can be rapidly integrated into useable military devices. To assist the teaming process an interactive web site has been established at URL: [www.sainc.com/DARPA/TASS/](http://www.sainc.com/DARPA/TASS/). Individual researchers and organizations with specific, applicable expertise or capabilities may provide non-proprietary descriptions of their capabilities and interests. The web site will remain active from the date of issuance of this BAA until proposals are due. Specific information content, communications, networking, and team formation are the sole responsibilities of the participants. DARPA will not participate in these activities other than to provide the web site forum to enable others to initiate communications. Individual efforts will be entertained where a convincing case can be made for comprehensive internal capabilities or broad applicability of the specified research. However, because integration challenges are so important in the development of military RF systems, a team approach where insightful research ideas are combined with excellent system engineering is likely to be more convincing.

**WHITE PAPERS:** White papers are limited to a maximum of ten (10) pages and should contain: 1) concepts for addressing the issues of high-Q tunability of HTS filters; 2) program plan with technical milestones for developing filters; 3) integration of filters with cryogenically-cooled semiconductor electronics; 4) optimized cryogenic packaging; 5) proposed funding level for the initial (near-term, 18-month) effort; and 6) if necessary, descriptions of experience and expertise of prime contractor and sub-contractors. All White Paper submissions will be evaluated by an expert Government panel for their responsiveness to the stated goals and objectives and of this BAA. If the white paper is deemed to be responsive, suggestions may be made for possible changes in scope and direction for the final (end of program, 36-month) proposal. Those meeting the criteria of this BAA will be asked to submit a full proposal. Proposers must submit an original and nine (9) copies of the White Paper to DARPA/ATO, 3701 North Fairfax Drive, Arlington, VA 22203-1714 (Attn.: BAA 99-24) on or before 4:00 PM, EDT 21 June 1999. White Paper must meet the objective and format guidelines as described in the PIP to be considered.

**FULL PROPOSALS:** Full proposal submissions shall be proposed in a two-phase effort. Phase I - Near Term, 18-month effort that demonstrates proof of concept and Phase II - End of Program, 36-month (total) effort achieving end of program requirements as outlined in the PIP. The technical proposal is restricted to 50 pages. Suggested format for full proposal: 1) introduction with statement of the perceived technical challenges and

the concepts to be exploited to satisfy the requirements of the PIP; 2) detailed technical discussions of implementation of the proposed concept, technical risks, and a set of metrics for periodically evaluating progress; 3) description of how these tunable filters will be integrated with cooled semiconductor components and packaged with a small, energy efficient cryogenic refrigerator; 4) list of participating organizations, their relevant expertise and which tasks will be performed by each team member, and the overall management plan; 5) A Statement of Work with technical milestones and deliverables, and 6) cost and implementation schedule. The total amount of funding available for this BAA is approximately \$30M distributed over three years, and, it is anticipated that there will be multiple awards as a result of this BAA. The most important part of the full proposal will be the technical concepts proposed for achieving frequency tunability while maintaining high unloaded Q-values, with appropriate tuning speed, resetability and repeatability requirements. Innovative approaches are desired. What is not wanted is a program plan starting with a theoretical survey of all potential techniques, continuing into a systematic materials development phase, and ending with optimizations of material properties and device characteristics. The end products of this Solicitation will be deliverable hardware demonstrating the approach achieved toward meeting the specification listed in the PIP. Proposers must submit an original and nine (9) copies of the full proposal to DARPA/ATO, 3701 North Fairfax Drive, Arlington, VA 22203-1714 (Attn.: BAA 99-24) on or before 4:00 PM, EDT, 22 September 1999. Full proposals must meet the objective and format guidelines as described in the PIP to be considered.

**PROPOSAL EVALUATION:** Evaluation of proposals will be accomplished through a technical review of each proposal using the following criteria: (1) scientific and technological merit of the proposed program; (2) offeror's capabilities, past performance, and recent related experience, including personnel, facilities, equipment and data; (3) impact of the successful development on defense systems; and (4) reasonableness of cost realism. All proposals will be reviewed by Government officials only. Input on technical aspects of the proposals may be solicited by DARPA from non-Government consultants/experts who are bound by appropriate non-disclosure requirements. Non-Government technical consultants will not have access to proposals that are labeled by the offerors as "GOVERNMENT ONLY." Restrictive notices notwithstanding, proposals may be handled, for administrative purposes only, by Strategic Analysis, Inc., a support contractor. This contractor is bound by appropriate non-disclosure requirements. The Government reserves the right to select for award all, some, or none of the proposals received. All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA.

**GENERAL INFORMATION:** Proposers must obtain a pamphlet entitled "BAA 99-24, Totally Agile RF Sensor Systems (TASS) Program Proposer Information Pamphlet (PIP)" which provides detailed information on objective, areas of interest, the submission, evaluation, and funding processes, proposal formats, and other program information. This pamphlet may be requested from the World Wide Web (WWW) or by fax, electronic mail (email) or mail requests to the administrative contact address given below. This announcement and the PIP may be retrieved via the WWW at URL <http://www.darpa.mil/ATO/> in the solicitation area. Proposals not meeting the format described in the pamphlet may not be reviewed. All administrative correspondence and questions on this solicitation, including requests for information on how to submit a proposal to this BAA, should be directed to DARPA/ATO-Patten, BAA#99-24, fax: (703) 696-3999, electronic mail (email): [BAA99-24@darpa.mil](mailto:BAA99-24@darpa.mil), or mail: DARPA/ATO, ATTN: BAA#99-24/Patten, 3701 North Fairfax Drive, Arlington, VA 22203-1714, e-mail or fax is preferred. DARPA intends to use electronic mail and fax for correspondence regarding BAA 99-24. Proposals may not be submitted by fax or e-mail; any so sent will be disregarded. DARPA encourages use of the WWW for retrieving the PIP and any other related information that may subsequently be provided. This notice, in conjunction with the BAA 99-24 PIP, constitutes the total BAA. No additional information is available, nor will a formal RFP or other solicitation regarding this announcement be issued. Requests for the same will be disregarded. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI specifically.